

## The disappearing of *palheiros* in Aveiro lagoon

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### Abstract

*Palheiros* are traditional timber constructions existing in the littoral centre region of Portugal. This is particularly the case of the Aveiro lagoon region where for many years many such constructions have existed. They were originally built to store working tools related with lagoon activity (fishing and sea salt extraction) and to give shelter for the fishermen during the fishing season. These constructions were built with superimposed veneers in vertical or horizontal directions. Since they are mostly located near the sea, they have started to be used as holiday houses and are often painted in vivid colours. Most of these buildings are being replaced by concrete constructions, since their preservation state is rather unsatisfactory or simply because there is a need to increase their size. Additionally, little knowledge about the possibilities of maintenance and building in timber structures exists. In some cases, although the structures were changed from timber to concrete, the exterior appearance of the *palheiros* remains the same, which might be interesting from the pictorial point of view but it isn't certainly from a heritage preservation perspective. However in many other situations, they are being substituted by "modern" constructions that were not valuable in any of the previous viewpoints. Fortunately, there are also cases where *palheiros* have been preserved and remain in good condition. For how long these examples will remain is certainly the major question that must be answered since these are only on the dependence of owner's will and not based on local authorities concern. A consciousness of local authorities and citizens is mandatory in order to preserve this heritage because it is perfectly possible to preserve the traditional constructions offering all the comfort of modern houses.

*Keywords: timber construction, vernacular construction, preservation.*



## 1 Introduction

Palheiros mainly exist in the littoral centre region of Portugal distributed over approximately 100 km. Although this is the most important region where palheiros exist, there are some other localised regions, where they can be found, probably derived from migration of people from the lagoon area that, during winter demand other places to fish [1]. They are located in the sand dunes near the sea and were intimately attached to a seasonal sea-fishing activity called *xavega*. Consequently, they were primarily built to be used as warehouses for fishing tools since fisherman lived in nearby places. Afterwards, fishermen started to live in palheiros during the fishing season and the quality of the construction increases. Later, bathers that demand beach during summer start to rent and to buy palheiros to live there during summer. This further increases the quality of the construction since bathers want better living conditions. Nevertheless, palheiros remain very simple constructions made of timber. This paper describes only those palheiros located in the region of Aveiro lagoon, ranging from S. Jacinto to Mira (see fig. 1). This region is located approximately in the middle of the region previously mentioned.



Figure 1: Geographical distribution of palheiros.

Timber was used in palheiros because is the cheaper and basically the only available construction material in the region. In fact, parallel to the sea, and coincident with the palheiros region there is almost a continuous maritime pine forest that provides the necessary timber. In the map of fig. 1 this pine forest is located in the *gafanha* region between two lagoon canals.

Since palafittes date in Europe from the Neolithic period, especially in lakes and river-sides, it is commonly accepted that these type of constructions are survivors of ancient periods. However, in the particular case of Portuguese palheiros, the very recent geological formation and the recent settlement of people, practically excludes this possibility. In fact, maps of the XIII century show that the area of Aveiro lagoon was occupied by the sea. During the subsequent centuries formation of the lagoon occurs and during several periods it has no contact with the sea which make this region rather insalubrious. Only in 1808 a permanent channel fixed the mouth of Vouga river and “stabilised” the lagoon area. The palafittic nature of palheiros of the Portuguese littoral was not related, in the majority of cases, with the presence of water, but inversely with the movement of sand. The most important exception to this situation were the palheiros of Costa Nova that were located on the lagoon-side and not near the sea. In this particular case, the palheiros even had a small pier to allow boats travelling in the lagoon to land [2].



Figure 2: Palheiro that was used as warehouse in Aveiro.

## 2 Characterisation of palheiros in Aveiro lagoon

Although palheiros of the littoral central region of Portugal have some common traces, there are also some differences in them. In [1] three different types of construction layouts could be identified. The one described here was labelled as *palheiro de Mira* in [1], and is present in a region starting north in the beach of Costa Nova and extends over 40 km to the south. Mira is the beach located in the centre of this area.

### 2.1 Structure

The soil in the zone of *gafanha* (fig. 1) is sand and there were no roads, so, the use of timber that exists there was the logical choice to made constructions near the sea. No stone or clay to make adobes was available, and even if it was available, the transportation of these materials through the sand of *gafanhas* would be very hard and expensive. Therefore timber was accessible and is lighter end cheaper than other construction materials.

The absence of potable water (the lagoon has sea water) and roads and the hard living conditions, impose that palheiros were utilised for only a few months (roughly from May to November) The structure of palheiros is naturally extremely simple reflecting their origin and occupation. In fact, it might be said that it was rough.

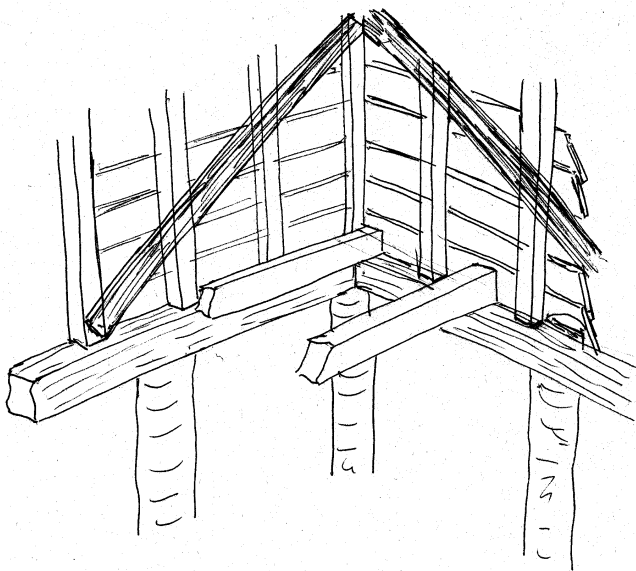


Figure 3: Typical structure of palheiros.

#### 2.1.1 Foundations

The initial palheiros were founded on poles like palafittes (fig. 3). The poles are headed by a grid that is independent from the rest of the construction. This type

of foundation allows sand to circulate freely under the construction. Additionally, it might be useful for particularly high flood-tides when palheiros were located in the lagoon-side. As the sand dunes become more stable the planks began to come till the ground and later this pole-system was substituted by adobes.

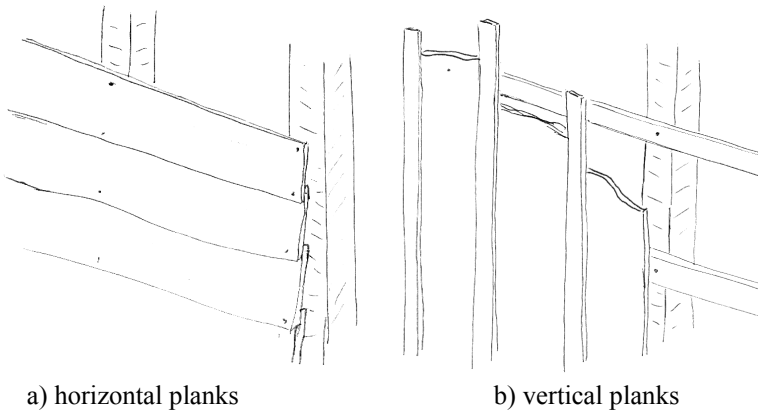


Figure 4: Wall structure of palheiros.



Figure 5: Structure of palheiros. Top left: horizontal planks. Top right: vertical planks. Bottom left: rafters and horizontal planks. Bottom right: roof and interior walls.

### 2.1.2 Walls

The first to be utilized and the simplest wall structure is that illustrated in the left of fig. 4. Vertical rafters, spaced about 45 to 50 cm, provide support for superposed horizontal planks that are nailed to them. The rafters are the vertical support elements and are headed by a beam. In the corners diagonal rafters brace the structure. Later, more sophisticated construction schemes as that exemplified at the right side of fig. 4, were used.

The revetment, in the interior, of the outer walls, when it exists was made by vertical rafters nailed over horizontal ones in a scheme similar to that of fig. 4 (right). This basic structure is often modified, usually to improve the comfort of the construction.

### 2.1.3 Interior walls

Initially, in the beginning of XIX century, the interior of palheiros were and open-space and divisions were made by straw mats. Later, when the occupation of palheiros was more permanent, divisions were built and the inner walls were simple wood-partitions (see fig. 5).

### 2.1.4 Roof

The roof structure is a simple timber truss, which, depending on the size of the palheiro, could be more or less complicated. In the façades, the wall rafters are extended to the roof and no truss exists. This system was used mainly because it was more economical than using a truss. The cover of palheiros were originally made of straw (in Portuguese *palha*) and that was probably the origin of the name *palheiro*. Later, ceramic tiles have been used to cover the roof.



Figure 6: Palheiros of Costa Nova (2004).

## 2.2 Colors

The first palheiros had usually dark colours. These colours result from the preservation products that were used in timber which are generally fish-oil mixed with some chromatic pigments (typically iron oxide or stone dust). However, Aveiro lagoon is a region full of light. Therefore, those that demand the region for leisure instead of work start to paint palheiros with more vivid colours. The preferred pattern was the painting of each plank in alternate colours (white and



red, white and blue, white and green ...). Costa Nova is a remarkable example of this situation (see fig. 6) where, even nowadays, many constructions are painted this way even if they are not made of timber.

### 3 Actual situation

The actual condition of *palheiros* could easily be described as ruinous. In fact, only a few original timber *palheiros* exist in the analysed region. Additionally, they are in a very poor condition. In Costa Nova, for example, there are about six *palheiros* in their original condition [3]. *Palheiros* had experienced uncountable mutations throughout the times. Most of these mutations were enforced by the need of adding comfort to the houses. Some of the mutations in some places like for example in Costa Nova are almost imperceptible since the appearance was almost leaved unchanged. As an example, the *palheiro* on the right side of fig. 7 only has the *façade* and the roof like traditional *palheiros*, although the appearance was practically the same; the one on the left is traditional.



Figure 7: Palheiros in Costa Nova.

The owner's interventions are usually carried out as they are needed and, some of the times, with no concern about the preservation of the vernacular. Other times there is no knowledge about traditional construction methods which makes it impossible to appropriate preserve the constructions. Another difficulty occurs by the fact that urban plans do not impose any type of preservation strategies.

Another common situation is the *palheiro-like construction* where the only resemblance of traditional *palheiros* is the dashed painting (see fig. 8) since there isn't a single piece of timber in those buildings nor a construction technology surviving from the traditional ones. This type of construction might have a perverse effect because it might give the community the impression that preservation is being made. According to [4], the preservation of the vernacular embraces not only the physical form and fabric of buildings, structures and spaces, but the ways in which they are used and understood, and the traditions and the intangible associations which attach to them.



Figure 8: Palheiro-like construction.

#### 4 Preservation strategies

Contemporary work on vernacular buildings, should respect their cultural values and their traditional character [4]. Additionally, the vernacular is only rarely represented by single structures, and it is best conserved by maintaining and preserving groups of a representative character. Any preservation strategy must comply with two basic criteria: (i) fulfil the acceptable standards of living and (ii) maintain the integrity of the siting.

Intervention strategies should be carefully planned and residents of the area are informed about how to proceed when they are needed. Some level of intervention could be established depending on the extent of damage and on the objectives pursued:

- Local preservation of damaged members, replacing part of the member, using epoxy resins, etc. but maintaining the element basically the same.
- Substitution of the element in the case that damage is such that local preservation would be impossible.
- Substitution of the structural system, preserving the construction know-how or alternatively, using alternative materials such as laminated timber.
- Definition of policies and urban plans that increase the use of timber as a construction material and preserve the basic typology



of palheiros in certain areas where there are until now a representative settlement.

- Enhance the knowledge about timber technology, either in architects, engineers and contractors, such that the use of timber in construction could be generalised.
- Definition of strategies in the community that lead to an increased understanding about the need to preserve the vernacular.

It is obvious that palheiros as they were built in the XIX or in the beginning of XX century can not be preserved or built since they were not suitable to nowadays requirements. However it is quite possible to preserve the built vernacular heritage of palheiros. Some issues must be taking into consideration:

- The use of timber as a construction material, in opposition of current construction materials such concrete or steel, should be increased since this material is eco-efficient, contributes to a sustainable construction, is locally available and build with timber is easy.
- It is possible to maintain the traditional construction procedures used in palheiros, mainly in roofs and façades, and accomplish an excellent behaviour of the structure.
- Local authorities should encourage and facilitate the owners of palheiros to preserve their houses, providing information and know how so interventions could be made with rigour.

## 5 Conclusions

Already in 1964, [1] stated that palheiros were disappearing rapidly. It was the construction of the distant dune without road access where maritime pine was the only available building material.

Preservation of palheiros is the preservation of memory. The memory of ancestors and the memory of ways of living that already disappear but are certainly part of our culture and certainly had influenced what we are and how we live. Preserving the past is certainly a way to save our future.

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